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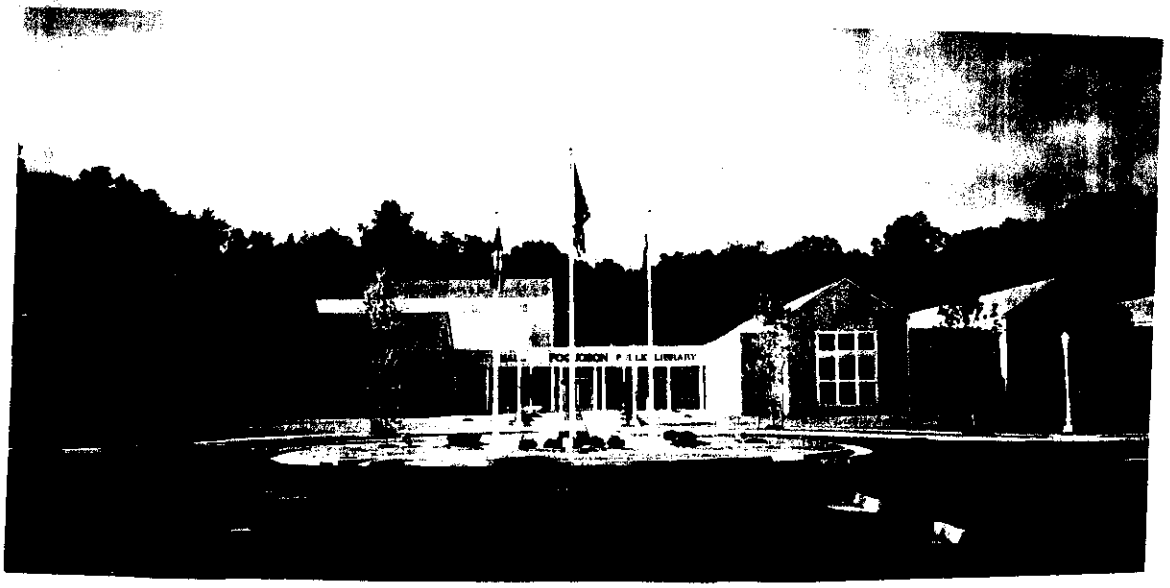
EXHIBIT NO. 2

City of Poquoson
1999 Comprehensive Plan 2004



"Building A Sustainable Community"

Comprehensive Plan Development Steering Committee

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ACKNOWLEDGEMENTS

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FOREWARD

The City of Poquoson's Comprehensive Plan attempts to address one essential question: How will Poquoson sustain itself as it heads into the 21st century? The Comprehensive Plan endeavors to provide the answers with a series of goals, objectives and strategies. The strategies were developed with consideration of the past, an evaluation of present, and most importantly a vision for the future as offered by its citizens. The key to comprehensive planning is to evaluate community issues as a whole, and to avoid consideration of issues in isolation. The considerable challenge in Poquoson is to balance the myriad of divergent convictions on critical issues so prevalent in our community. Issues such as:

- *Preserving private property rights and developing needed community land use policies*
- *Providing excellent government services and facilities while maintaining low taxes*
- *Encouraging economic development without hurting existing businesses and resorting to strip commercial sprawl*
- *Extending sewer service throughout the city and making it affordable and equitable*
- *Providing a network of safe and efficient roadways and bikeways without disrupting neighborhoods*
- *Managing the growth of our community and still maintaining its small community atmosphere*

The only way to address such issues is through effective planning. The Comprehensive Plan provides a "roadmap" to help ensure Poquoson remains a sustainable community. Poquoson's sustainability can only be assured if its leaders use the Comprehensive Plan like a traveler uses as roadmap on a long journey. The Plan should provide our City leaders the guidance they need to address difficult issues, which tend to form like crossroads in our community. Mere adoption of this plan is not the answer. Implementation of the Plan's strategies is its key. The Plan, like the roadmap, does not provide the only way to go. It also provides alternative routes.

Thank you to the dozens of city staff members, elected and appointed officials, and most of all the citizens who volunteered their time and effort toward this considerable planning challenge.

J. W. Hollingsworth
Director of Planning & Community Development

Jeffrey J. Mihelich
Former Director of Planning & Community Development

*Please note that all charts, figures, and exhibits reflect U.S. census information for the years 1990 – 1996 as well as HRPDC.

COMPREHENSIVE PLAN LIST OF EXHIBITS AND CHARTS

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Exhibit 3	Shoreline and Erosion Potential
Exhibit 4	Flood Plain
Exhibit 5	Poquoson Wetlands by Group
Exhibit 6	Plum Tree Island National Wildlife Refuge
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The Planning Process

The City of Poquoson's Comprehensive Plan Update process involved two parallel work efforts:

- A public participation element comprised of public input meetings designed to inform City residents while soliciting their views for the future, and

- A technical planning element which included the collection and analysis of background data needed to form planning and development recommendations used to create goals, objectives and strategies for the final Comprehensive Plan document.

In March 1995, the Poquoson City Council approved a methodology for updating the Comprehensive Plan. This methodology called for the creation of two groups each responsible for accomplishing one of these work efforts. The first group, the ***Community Participation Team***, was composed of four members of the Planning Commission and seven members from the community at large. It was responsible for encouraging, facilitating, and reporting citizen participation in the planning process. The second group, the ***Comprehensive Plan Development Steering Committee***, was composed of four members of the Planning Commission and one member of the Community Participation Team. It was responsible for reviewing citizen input generated by the Community Participation Team. The Steering Committee also identified issues, reviewed technical data, offered strategies and policies for the future and made a final recommendation to the full Planning Commission on the Comprehensive Plan update.

Public Participation

Public participation was based on the premise that community planning begins with open communication and the exchange of information and ideas. With this exchange, a Comprehensive Plan could be created to develop effective actions for the future while having broad public support.

The Community Participation Team

City Council appointed a Community Participation Team responsible for developing the overall communications plan, which encouraged citizen participation in the update process. The team met weekly from April through June 1995. It designed public involvement programs, monitored outreach efforts, and evaluated the results of public input meetings. It also led a highly publicized, community-wide effort to involve citizens in planning their future and the future of the City.

Citizen Outreach Efforts

Throughout the Comprehensive Plan Update process, a variety of methods were used to maximize citizen participation in the planning process. Prior to the beginning of the public input sessions, flyers announcing the meetings were distributed widely to area school students, church organizations and civic groups. Volunteers also traveled throughout the City placing flyers in store windows and other highly visible locations. A video program was also developed and broadcast over the community access channel. The video featured an explanation of the update process, discussions with City staff and appointed officials, interpretations of relevant technical data, and most importantly, the video program challenged the citizens of Poquoson to get involved in the update process to address some key issues facing the City. In April and May of 1995, the *Daily Press* and the *Poquoson Post* printed a series of editorials, written by City staff, which considered different aspects of the plan update. As the update process began, the City kept tracking the progress of the update process each month in the City Newsletter. Direct mailings were made to area civic groups informing them about the process and advising them that City staff members would meet with their group to present additional details. Finally, an art contest was sponsored at the Poquoson Primary School wherein each student was given an opportunity to draw a picture of what they thought Poquoson would look like in the future.

Community Leaders' Kickoff

On May 3, 1995, Poquoson held a community leaders kickoff breakfast to explain the Comprehensive Plan Update process. More than 75 community leaders from throughout the City met at Tabernacle United Methodist Church for this event. Leaders were acquainted with the manner in which the City Council had decided to conduct the Comprehensive Plan update process and were urged to encourage others in the community to participate in the development of the plans.

Volunteer Citizen Facilitators and Notetakers

On May 4, 1995, twenty citizens participated in a training session in preparation for the public input sessions. These citizens were trained to facilitate and take notes during small group discussions at two public input sessions held later that month.

Public Input Sessions

On May 11, 1995, the first public input session was held at Poquoson High School. Seventy-two citizens participated in the session. At this session, citizens were given an overview of the comprehensive planning process and a summary of expectations for that evening's meeting. During the meeting, citizen participants were divided into small groups (less than 15 members) and trained citizen facilitators led each group through a two-hour session. Citizens were

encouraged to voice their opinions, likes, concerns, and their outlook for the future on each of the following topics:

- **Parks and Recreation**
- **Public Facilities/Services (Library, Fire, Police, Solid Waste, etc.)**
- **Infrastructure (Streets, Sidewalks, Bikeways, Sewer, Water, Drainage)**

Citizens were also asked to provide their vision for the ideal Poquoson of the future.

The second public input session was held May 18, 1995 at the Poquoson High School with 81 citizens in attendance. Citizens were encouraged to voice their opinions, likes, concerns, and their outlook for the future on each of the following topics:

- **Education/Schools**
- **Land Use**
- **Economic Development**
- **Taxation**
- **Comments On Other Issues**

Trained citizen notetakers recorded citizen input during each small group session and forwarded their completed notes to staff for typing and, ultimately, review by the members of the Community Participation Team. Each of the public input sessions concluded with a twenty-minute summary. The summary, conducted by the small group facilitators, summarized the points of general consensus reached during the evening's small group sessions.

Citizens Opinion Survey

In May 1995, the Community Participation Team developed a "Citizen Opinion Survey" to gather additional citizen comments for the 'comprehensive Plan Update Process. The self-administered four-page survey asked for citizen comments on a variety of key issues facing the City. Each Poquoson household (over 4,100) was provided a copy of the survey for their input. The survey included a postage paid return envelope, which allowed each household the opportunity to participate without paying for postage. Oer 1,200 surveys were returned for a 30 percent response rate. Considering that no follow-up mailings were administered, the Community Participation Team was pleased with the response rate, and felt the survey results would therefore be a good sampling of citizen opinion.

Distribution of Public Comments

All public input session notes, were subsequently typed, edited and bound. The citizen opinion survey results were also tallied, summarized and bound. Copied of all the citizen comments were made available for citizen review at the Poquoson Public Library and the City Manager's Office.

Consideration of Public Comment

After compiling the citizen comments generated during the public input sessions and the citizen opinion survey, the Community Participation Team met on June 28, 1995 to consider the results. At that meeting the Community Participation Team deliberated for several hours to develop a list of comments the group felt objectively represented those areas of general consensus as identified in both the public input session and the results of the survey. The committee formulated the consensus areas, formally approved the list, and forwarded its comments on to the Comprehensive Plan Development Steering Committee. Copies of the Team's final comments were also made available at the Poquoson Public Library and the City Manager's Office for citizen review.

Comprehensive Plan Development Steering Committee Review

As the initial public input segment drew to a close, the Steering Committee geared up for its deliberations. Beginning in October 1995, the Steering Committee began meeting to develop the draft elements of the Comprehensive Plan. The Committee continued to meet through July 1996. Each Committee meeting was advertised and open to the public. This provided additional opportunities for citizens to voice their opinions, suggestions, or visions for the future. All written material reviewed by the Committee was made available at the Poquoson Public Library and the City Manager's Office for citizen review.

The Steering Committee reviewed and accepted the final deliberations of the Community Participation Team and used the citizens' comments to develop the Plan's goals, objectives and strategies. For the next several months the Committee reviewed each draft element of the Comprehensive Plan. The Committee's deliberations on each of the elements occurred as follows:

1995

October 30th

-History
-Demographics

January 31st

-Housing
-Parks & Recreation
-Environment

July 17th	July 18th
-Transportation	-Education
-Utilities	-Economics
-Community Services	-Land Use

Each element listed above contained background material, technical data, citizen input, and a statement of goals, objectives and strategies for each topic. Draft plan text was written based on the Committee's deliberations. Proposed changes to the Land Use Plan Map were included as part of the review of Land Use.

On July 18, 1996 the Committee met for the final time and decided to forward the final draft to the full Planning Commission for consideration and adoption in August 1996.

In all a dozen formal opportunities were made for citizens to provide comments and thoughts with regards to the City's Comprehensive Plan.

History of Poquoson

Poquoson ~~"Low lands", A term derived from Native Americans, and used by the early settlers of the 17th century to describe a boundary line between two elevated tracts of land.

Long before Europeans began exploring the "New World" what is now the City of Poquoson was home to Native Americans. This area was a popular camping and fishing spot. The Native Americans would haul their catch in dugout canoes to the mouth of "Injun Creek". An oyster shell pile that may date back to the 1500's is still visible from what is now the Amory's Wharf landing area.

Poquoson: Its early history...

The first mention of Poquoson – was in the Captain Christopher Calthorpe land grant issued by a court in Elizabeth City on April 26, 1631. Settlement of the Poquoson area was opened in 1628 by order of the Council of State at Jamestown. Many of the early settlers were plantation owners, who with their tenants and apprentices, originally lived south of the Back River. People who received some of the first land patents include:

- Thomas Brice – 200 acres in 1633 on Blackwalnut Neck
- Augustine Warner – 450 acres in 1635 on Pasture Neck
- Samuel Bennett – 450 acres in 1636 on Bennetts' Creek (part of this plantation was sold to Richard Brown after the Revolutionary War on land now known as Brown's Neck)
- William Cloyse – 750 acres in 1638 on land eventually acquired by John Hunt (now known as Hunts' Neck)

The Great Marsh was originally divided into many small plantations, but was later merged into a massive patent of 1,695 acres in 1663. The area was divided into smaller tracts in the early 1880's. The Great Marsh along with Messick Point (originally called Boar Quarter Point) and Tinkersheires Neck were all very important shipping points as early as 1635 for tobacco and other products from the plantations.

After the Revolutionary War, and especially during the period of the War of 1812, the larger colonial plantations were sold into smaller farms because they were no longer financially viable. Many of the people buying the farms were Methodists from the Baltimore and Eastern Shore area. This denomination is still prevalent in the City today.

For well over a hundred years Poquoson remained a "backwater" farming and fishing community. While there was extensive civil war action on the Peninsula, there is no known troop movement or other war activity in Poquoson itself. Many citizens fought for the confederacy, however.

First Families & Historical Names...

Some of the early family surnames prior to the Revolutionary War that remain with descendants in the city include Freeman, Moore, Hunt, Holloway, Watkins, Fawlings and Smith. Many (arriving after the war) include the Bradshaw, Evans, Forrest, Firth, Firman, Pauls, Watkins, Hudgins, Rollins, and Insley families.

In addition to the former post office names, such as Messick, Odd, Jeff's and Moore's, the Poquoson area has been known at various times as "New Pocosin", Charles River Parish, Hampton-York Parish and eventually as the Poquoson Magisterial District in southern York County. At some earlier point in time, Poquoson even took on the nickname of "Bull Island." Though the nickname was strongly resisted by some of the earliest residents, it has generally become widely accepted as an affectionate term. In fact the title of the Poquoson Historical Commission's monthly bulletin is Poquoson (Bull Island) Heritage.

Geographical Boundaries...

The Town of Poquoson was formed from the southern half of the former Poquoson Magisterial District of York County. The Poquoson District was bordered on the east by the Chesapeake Bay, on the north by the Poquoson River, by the City of Hampton and the Northwest Branch of the Back River on the south, and by York County on the west.

Victory Boulevard from the west and Wythe Creek Road from the south provide the only accesses to the City. Until November 1896, persons driving from Poquoson to Hampton had to take Yorktown Road to the Tabb area and cross the Northwest Prong of Back River at the site of the present Bethel Reservoir. In 1896, the "new road" – Wythe Creek Road – and the "new bridge" were opened, making travel to Hampton more convenient.

In 1834, the Poquoson Parish (which originally included the areas known today as Poquoson, Tabb, Grafton, Dare and Seaford) was named as a beneficiary in the will of Benjamin Symms. The will provided for "a free school to educate and teach the children of Elizabeth City and Poquoson".

In 1952 the southern portion of the Poquoson District in York County was incorporated in an effort to regain control over its schools. In 1975, the Town of Poquoson was subsequently chartered as an independent city.

From Waterman and Farmers...

For more than one hundred and fifty years Poquoson residents made their living as farmers and watermen. In 1916, aeronautical activities began at Langley Air Force Base when the U.S. Government purchased the land upon which most of the present Air Force installation now stands. World War I and the construction of Langley Field changed the rural lifestyle of Poquoson.

In the years following World War II, more rapid change and population growth occurred. Farming and fishing gave way to sub-urbanization. This trend in population growth continues today. Between the years of 1970 and 1979, Poquoson incurred a net migration of 5,586 residents. At the same time the net migration for the total Peninsula was a loss of 7,219 residents, while all of Hampton Roads netted a loss of 5,184. By the end of 1990 the Peninsula had a net increase of 6,500 residents while Poquoson netted an increase of 7,215 residents!

Tradition of Pride in Poquoson Schools...

The determination of the people in the Poquoson Magisterial District to keep their high school in Poquoson caused the present City of Poquoson to break from an association with York County. During the 1800's and early 1900's there were may "grammar schools" in the Poquoson area. There was one near Trotter's Bridge on Hunt's Neck Road, another near the present Emmaus Baptist Church, and several others.

The first high school was built in 1910 at a cost of $6,000. The high school stood at the location presently occupied by the Poquoson Middle School. It housed the entire student body from Grade 1 through graduation and was the only high school in all of York County! Prior to 1915, Poquoson children attending high school stayed with relatives in surrounding areas, even as far as Norfolk.

In 1932, a brick high school was erected in the west yard of the original site. The core of the present Middle School is composed of this structure. The original building and the new brick building were each financed by a bond issue passed by the people of the Poquoson District. As it was still the only high school in York, all students from as far away as the Naval Weapons Station were bused to this school.

The high school continued to grow and eventually repairs were needed as well as an increase of space to accommodate all of the incoming students. The York County Board also considered moving the high school to a more centrally located part of the County. Poquoson residents eventually realized that the only way to keep their cherished and hard-earned high school was to incorporate as a town with a separate school district. On July 1, 1952, the Town of Poquoson came into being. In the mid 1950's, the present Poquoson Elementary School was built and the original two-story clapboard building was razed. The present High School was erected in the mid 1970's. The latest addition to the school system's buildings is the Primary School built in the late 1980's.

First Council...

The first elected mayor of Poquoson was Carroll Thomas Forrest who ran with no opposition. The Council also included William W. Joyner and John B. Graham, Sr. from the Trinity Precinct; from the Tabernacle Precinct were H. Frank Hunt and Joseph R. Moore Sr., who was also elected Vice Mayor. Robert J. Watkins was Town Manager and Attorney, Alvah E. Riggins

was Town Clerk, Linwood I. Burcher was Town Treasurer and G. S. Forrest was Clerk of the School Board. Francis (Mrs. Joseph) Burlock was Office Manager.

Attraction to Poquoson...

It was the water that brought the first settlers to Poquoson. Though the water may still hold the spell over many a Poquosonite today, the city continues to attract new residents today for a variety of reasons:

- Proximity to major employment sites including military bases, NASA, the Newport News Shipyard.
- Waterside recreation and the Chesapeake Bay. Poquoson is perhaps best defined by its kinship to the water.
- Low crime rate. The lack of serious crime is a testament to the sound values of Poquoson residents and the vigilance of the Poquoson Police Department.
- Excellent school system. The Poquoson School System has consistently ranked among the best in the State. As it was in the beginning, education is still the "pearl in the Poquoson Oyster."
- Small town atmosphere. Wonderful, compatible neighbors who have the common interest in the well being of the City of Poquoson and their families.
- Independence!!!!

Poquoson is, according to historians, the oldest, continuous, English-speaking settlement in the United States that still bears its original name – Pocosin. (April 1631)

The past is but the beginning of a beginning,
and all that is and has been is but the twilight
of the dawn.

--H. G. Wells (1866-1946)

Demographics

Introduction

Population characteristics of a City have a profound effect upon its development. Poquoson is predominantly a "bedroom community" wherein the vast majority of its residents live in the city and commute to other localities to work. Poquoson's average family income is the highest in Hampton Roads. The predominant household in our City consists of two adults, two children and an income of more than $53,533 annually. These factors have a substantial impact on the type of housing built in the City.

Population

The Hampton Roads Peninsula has experienced considerable growth in the past decade. According to statistics provided by the U.S. Census Bureau, Poquoson incurred a 26 percent increase in population between the years 1980 and 1990, second only to James City County (see Table 1). The most recent estimate of Poquoson's population is 11,400 in 1994*. At an average annual growth rate of 2.6 percent between 1980 and 1990 the current population is estimated to be slightly less than 12,000.

- Weldon Cooper Center for Public Service – University of Virginia

TABLE 1

POPULATION CHANGE THROUGHOUT THE PENINSULA, 1980-1990

LOCALITY	POPULATION		CHANGE, 1980 – 1990	
	1980	1990	Number	Percent
Hampton	122,617	133,793	11,176	9.1%
James City County	22,339	34,859	12,520	56.0%
Newport News	144,903	170,045	25,142	17.4%
POQUOSON	**8,726**	**11,005**	**2,279**	**26.1%**
Williamsburg	10,294	11,530	1,236	12.0%
York County	35,463	42,422	6,959	19.6%
Peninsula	344,342	403,654	59,312	17.2%
State	5,346,818	6,015,100	668,282	12.5%

Source: U.S. Census Bureau

The bulk of the City's population growth occurred during the period between 1970 and 1980, when the City experienced an increase of 3,285 persons. This increase translates into an average annual growth rate of 6.0 percent. In contrast, the respective average annual growth rates for the region and the State during that time period were 0.8 percent and 1.4 percent respectively - considerably lower than Poquoson's growth rate.

Poquoson's population growth is primarily the result of the migration of people into the City rather than by natural increase (births minus deaths). Net migration - the difference between the number of people moving into the City and number moving out - accounted for 73 percent of the City's population growth between 1980 and 1986.

Age Distribution

Between 1980 and 1990 there has been very little change in the distribution of population by age based upon a percentage of the total population shown in Table 2.

Table 2 - City of Poquoson Distribution

	1980		1990	
	Numeric Population	% of Total	Numeric Population	% of Total
Age				
5 & under	550	6%	824	8%
6 to 19	2,593	30%	2,523	23%
20 to 34	1,834	21%	2,100	19%
35 to 64	3,149	36%	4,624	42%
65 & over	592	7%	925	8%
Totals	8,726	100%	11,005	100%

Source: U.S. Census Bureau

The minor upward shift in the average age of Poquoson's population can be attributed to advancements in the medical field, which has been a nationwide trend.

A more detailed population analysis on school-aged children is found in the Public Education Element.

Geographic Population Distribution

As noted in the History element of this Plan, Poquoson's population was concentrated in the eastern portion of the City during the 1800's and early 1900's. As more roadways and sewer lines were extended westward, and as the prime waterfront properties were developed, more and larger subdivisions sprang up.

Exhibit 1 shows the geographic population distribution in the City in 1990. The extreme eastern portions of Poquoson continue to be the most sparsely populated due to extensive marshlands, while the central portions of the city are more densely populated due to smaller lots and multi-family housing units. The western portions of the City are predominantly developed with low-density single-family homes and unless land regulations change, this area will continue to be very suburban in density due to the large minimum lot size requirements in the City's Zoning Ordinance.

Income

Overall, incomes are higher in Poquoson than in the rest of the region. Table 3 shows that the 1990 median household income for Poquoson was $47,373 and $32,107 for the Peninsula - a differential of $15,266. In contrast, the differential in 1979 was $6,918 - slightly less than half as much.

TABLE 3

REAL MEDIAN HOUSEHOLD INCOME THROUGHOUT THE PENINSULA
1979- 1990

LOCALITY	1979	1990	Change 1970 -1990 Dollars	Percentage
Hampton	$16,971	$30,665	$13,694	80.7%
James City County	18,708	39,729	21,021	112.4%
Newport News	15,974	28,160	12,186	76.3%
POQUOSON	**23,969**	**47,373**	**23,404**	**97.6%**
Williamsburg	15,009	28,776	13,767	91.7%
York County	20,918	42,018	21,100	100.9
Peninsula	17,051	32,107	15,056	88.3%

Source: U.S. Census Bureau, University of Virginia Center for Public Service (1990 projections)

While in nominal terms the median household income in Poquoson and the region rose significantly between 1979 and 1990 (by 98 percent and 88 percent respectively), this is more a result of inflation than *real income* gains. The increases in income, as shown in Table 3, are much smaller when the effect of inflation is considered. In *constant* 1982-84 dollars, Poquoson's median household income increased by 11 percent. Similarly, the entire region experienced a negligible 5 percent increase in median household income.

A more detailed income analysis and its impact on the future of Poquoson is found in the Economics Element of this Plan.

Population Projections

In general, no one forecasting model is better than another. All projecting techniques require the user to accept a variety of assumptions concerning the population in a community and the forces that influence its growth. Often there is little upon which to base future projections other than past trends, and the validity of this approach is limited since we know that patterns change. Through the use of these past trends and our best judgment, we have projected the future demographic base in order to plan for tomorrow.

The only real undisputed population counts are those statistics compiled by the U.S. Census during its decennial census. All population counts should be derived from that base.

The Hampton Roads Planning District Commission (HRPDC) is responsible for updating the long-range transportation needs of our region's metropolitan area every five years. The process began in 1965. Most localities in the region, including the City of Poquoson, rely on the HRPDC to a great extent for reliable future demographic projections.

The HRPDC has developed population projections for the entire region through 2015. This projection is based on the U.S. Census Bureau's 1990 decennial census and the long-range employment forecasts developed by the Virginia Employment Commission and the Virginia Department of Planning and Budget. These forecasts are based on historic growth patterns including in and out migration, employment projections, and military base realignment and closures, which have a dramatic impact on the population of this region.

Poquoson's population is expected to increase 31 percent between 1990 and 2015, compared to an increase of 25% for the Peninsula. Population projections are shown in Table 4.

TABLE 4

POPULATION PROJECTIONS THROUGHOUT THE PENINSULA, 2000 -2015

LOCALITY	2000	2010	2015
Hampton	142,110	146,648	148,109
James City County	44,273	54,004	59,188
Newport News	184,787	198,832	203,593
POQUOSON	**12,880**	**13,833**	**15,306**
Williamsburg	12,564	13,221	14,351
York County	49,494	56,000	59,640
Peninsula	433,774*		557,901

Source: Virginia Department of Planning and Budget; Statistical Digest 1995; HRPDC 1994
Peninsula population total for 1990

Exhibit 16A shows the projected geographic population gain between 1990 and year 2015. This map indicates that the majority of the City's population growth will occur in the western portions of the City. The eastern sectors of the City will experience only minor in-fill development and the central portions of the City which are practically built-out will also see moderate growth with only a scattering of small subdivisions (less than 20 lots). The western portions of the city, where there is still a great deal of undeveloped land, will continue to grow at a much faster rate. The key to growth anywhere in the City, but particularly in the western sectors, is the extension of sewer and stormwater management systems.

Environment

Overview

Poquoson's natural environment is one of its most valuable assets, and at the same time one of its most vulnerable. The City is a peninsula surrounded by major water features on three of its borders. Significant environmental features include extensive wetlands, a high water table, hydric soils, non-tidal wetlands, scenic vistas, historic sites, wildlife and woodland areas. The City, located adjacent to several major employers, is experiencing development pressure. Primary environmental concerns arising from this combination of circumstances include deforestation, shoreline erosion, stormwater runoff from developed surfaces, septic system failures, destruction of wildlife habitat, degradation of water quality, and air pollution from automobiles and surrounding industries. Tightening public budgets, private property rights, an active development community, and the regional scope of some issues tend to challenge environmental protection issues.

General Physical Setting

The City of Poquoson is located at the eastern tip of Virginia's lower Peninsula, which is formed by the York River, the James River and the Chesapeake Bay. The city is bounded by the Poquoson River on the north, by the City of Hampton and by the Northwest Branch of the Back River on the south, by the Chesapeake Bay on the east and by York County on the west. Total land area is approximately 9,395 acres or about 15 square miles. There are ~~84~~ approximately 168.5 miles of shoreline along the rivers and marshlands. Of its total land area Poquoson has 5,089 acres of wetlands. This amounts to roughly 54% of the total land area. The wetlands ~~This~~ includes the 4,100-acre Plum Tree Island Marsh, the largest saline marsh in the lower Chesapeake Bay. Large forested areas are still present in the City but are rapidly deteriorating due to increased residential development. Two thousand acres of Poquoson's 9,385 acres are comprised of agricultural, wooded or open areas.

Climate

Historic Precipitation Records
Inches of Precipitation

Monthly Averages			
January	3.41	July	5.01
February	3.21	August	4.90
March	3.67	September	4.45
April	2.85	October	2.88
May	3.68	November	2.73
June	3.63	December	3.00

The climate on the Virginia Peninsula has been traditionally mild as evidenced by the average temperatures and long growing season. The average January temperature is 42 degrees Fahrenheit and the average July temperature is 79 degrees Fahrenheit. The growing season is 190 days from spring through fall. Poquoson's average annual rainfall is 45 inches and is well distributed throughout the year. The prevailing winds in Poquoson are from the south to southwest, with a secondary frequency from the north. Hurricanes and "northeasters" occasionally affect Poquoson and create tidal flooding.

Thunderstorms with hail and strong wind are much more frequent and often inflict heavy storm damage.

Air Quality

With Richmond to the west and the Hampton/Newport News/Norfolk/Virginia Beach Metropolitan Area surrounding the city, air quality in Poquoson is easily influenced by activity outside its borders. The air quality of Poquoson itself is of generally good quality but must be continually monitored. Numerous cars and a variety of industries in Virginia's Peninsula and southeastern localities emit various forms of air emission/pollution. The well being of a community, both in terms of health and economic development, depends on air quality. In terms of human health, poor air quality can affect those residents that have particular sensitivities (e.g. asthma) to degraded air quality. Hot and humid days often force these people to curtail outdoor activities when pollutant levels are high.

The economic health of a community may also suffer as a result of having existing businesses and industries which, as permitted and controlled through the Air Pollution Control Board, must limit certain air pollutant levels through the use of expensive technology. Taken together with surrounding industries in neighboring localities, the allocation level for a particular pollutant may be nearing the maximum permitted level since older technology may still be in use. As a result, new industries or existing plants undergoing expansion often must install expensive air pollution reduction equipment. In some instances the costs associated with installation of advanced air pollution removal equipment force some potential companies to look at alternate locations where air quality levels can accommodate their projected emission rates without that equipment.

The implication for Poquoson is that, as part of a regional air shed defined as the Peninsula and Southeastern Virginia localities, air pollutant standards will be increasingly difficult to meet as new legislation begins to take effect. While air quality in Poquoson is generally satisfactory, major industries are currently faced with the expense and selection of the best method for complying with the mandates of the Clean Air Act.

Air quality is a regional problem that demands regional solutions. Even so, there are several local issues that should be considered. Land use patterns and development actions can have a significant local effect on air quality. Suburban land use patterns, which maintain and often increase auto dependency, contribute to ozone and general air quality concerns.

Federal Air Quality Standards

Air quality in Hampton Roads is examined and measured in terms of air pollutants that are either in gaseous and or particulate (i.e. solid) forms. Federal legislation has established National Ambient Air Quality Standards (NAAQS) for the following pollutants: sulfur oxides, total hydrocarbons, nitrous oxides and lead. NAAQS are determined by the U. S. Environmental Protection Agency (EPA) and are monitored by the respective states. The Virginia Department of Air Pollution Control (VAPC) has established a regional network of monitoring stations to collect

detailed air quality data. The Clean Air Act of 1990 requires a significant reduction in existing levels of sulfur dioxide emissions for all industries. The Environmental Protection Agency (EPA) is instituting a number of different methods to reduce emissions. While there are no major stationary sources of air pollution in the City of Poquoson, the Virginia Power Plant in Yorktown for example, is using a new sulfur oxide reduction process called limestone injection multistage burner (LIMB) systems that should reduce sulfur dioxide emissions by 50 percent.

The Clean Air Act is implemented by the U. S. Environmental Protection Agency, which has established "primary" and "secondary" NAAQS for certain air pollutants. The primary standard must protect the "public welfare" which is interpreted to mean all environmental and economic interests.

NAAQSs regulated by the Clean Air Act are a part of Virginia's State Implementation Plan (SIP) and are administered by the Virginia Air Pollution Control Board. The SIP places emission limitations on stationary sources (i.e. existing industries) and, to a certain degree, mobile sources (i.e., automobile usage).

The City of Poquoson is part of the Hampton Roads Region, which means that air quality standards for the region as a whole (i.e. Southside and Peninsula) affect the City's air quality standing. A region may be classified as one of the following:

1. Attainment - meeting all NAAQS
2. Non-Attainment - failing to meet one or more of the NAAQS
3. Prevention of Significant Deterioration (PSD) - air quality that exceeds ~~any NAAQS~~ several limits set by the NAAQS.

One of the primary sources of ozone is automobile emissions. Provisions of the Clean Air Act limit emissions of new vehicles, require oil refiners to develop cleaner automotive fuels, and mandate that each state include "transportation controls" within their SIPs. These controls include such measures as improved public transit, bike lane facilities, car pool lanes, staggered work hours, etc. Should non-attainment status for ozone in the region not occur, federal funding for highways might be in jeopardy.

The Hampton Roads Region ~~is in violation of the National Ambient Air Quality Standard for ozone (smog). This non-attainment status is listed as marginal, which is the least restrictive category.~~ was classified as a marginal "non-attainment area on November 6, 1991. ~~This~~ The designation ~~will affect~~ affected new and existing industries, as well as the ability to attract new industries, but ~~will~~ did not require basic motor vehicle emissions Inspection and Maintenance (I&M) program. On June 26 1997, the EPA redesignated the Hampton Roads area to "attainment" and approved an ozone maintenance plan as part of a revision to the SIP. This redesignation is based upon three years of quality-assured ambient air monitoring data for the areas that demonstrate that the NAAQS for ozone have been attained. The ozone maintenance area includes the counties of James City and York, along with the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and

Williamsburg. Being in an ozone maintenance area, ~~The State and~~ the Hampton Roads region may require tail pipe emissions testing during vehicle inspections in the near future.

Open Burning

Open burning is regulated in all the Hampton Roads localities, including Poquoson, because the by-products of open burning include air pollutants such as carbon monoxide and hydrocarbons. Hydrocarbons indirectly contribute to the surface ozone problem, however, the State Air Pollution Control Board has indicated that open burning is a small contributor to the hydrocarbon problem. The permit for open burning ~~is~~ may be issued by the State Air Pollution Control Board and/or the City's Fire Department depending on the extent of the burning. Most permits are for the burning of land clearing refuse such as brush, stumps, treetops, etc. It is less expensive to burn this refuse than to pay a subcontractor to chip the wood or haul it away.

Volatile Organic Compounds

Ozone is a poisonous form of oxygen that can damage animal and plant tissues, and cause coughing and wheezing, and may aggravate asthma and other breathing disorders. Ozone is created in the atmosphere by a chemical reaction between volatile organic compounds (VOCs), such as gas fumes, nitrogen oxides from fuel combustion, and other VOCs. Oil based paints are commonly used by individual homeowners and painting contractors; however, oil based paints emit volatile organic compounds (VOCs) into the atmosphere during the drying process through evaporation. In addition, equipment used in oil painting is cleaned with solvents, which also emit VOCs into the atmosphere. VOCs indirectly contribute to the surface ozone problem. Thus, discouraging the use of oil based paint, and encouraging the appropriate disposal of household cleaners, paints, thinners and glues, which also emit VOCs, would be a positive contribution to the surface ozone (or smog) problem.

Air Quality Improvement Measures

There is a local effort to maintain or improve the air quality in Poquoson. In order to help improve its air quality ~~in~~ the City of Poquoson ~~the city~~ should institute the following:

- Discourage the development of "smoke stack" industries that emit ambient air pollution.
- Develop and implement a Transportation Demand Management (TDM) Plan, in concert with other Hampton Roads localities that provide for increased public transit, pedestrian facilities, ride sharing and other "non-single occupant" transportation modes. (TDM is more fully explained in the Transportation Element).
- Encourage land use patterns that do not rely so heavily on intensive automobile use.

- Support the implementation of a basic motor vehicle emissions Inspection and Maintenance (I&M) program throughout the Hampton Roads Region.

- Continue to regulate open burning, and consider eliminating open burning of land clearing refuse for major subdivision projects.

- Work with the Virginia Peninsulas Public Service Authority to provide recycling opportunities for the proper disposal of automotive and machine fluids, household cleaners, paints, thinners, glues and other fluids and chemicals that emit volatile organic compounds.

- Create Bikeways

~~Land~~Physical Constraints to Development

The City of Poquoson is blessed by its proximity to the Chesapeake Bay and the accessibility of the water to its citizens. This convenience does not come, however, without its associated environmental factors, most of which are water driven. Physically constrained lands, for clarification, are those areas of the City identified as containing natural environmental elements to be protected and which have a significant impact on a number of elements of the Comprehensive Plan.

The City of Poquoson must consider such natural environmental elements as a city wide high water table, numerous tidal and non-tidal wetland areas, hydric soils, soils with high shrink-swell potential, poorly drained soils, and the Chesapeake Bay Preservation Areas when planning for development. For the most part, the City does not face large areas of highly erodible soils, highly permeable soils, or steep slopes.

Poquoson's future development will be greatly affected by its natural resources. Consequently, it is necessary to discuss the development potential and limitations of the City's topography, geology and soils, surface and groundwater, shorelines, wetland and floodplains. In many instances careful planning will be necessary to avoid harm to the sensitive environment in which Poquoson is located.

Forest and Farm Lands

Vegetation serves important functions in maintaining the land and supporting development by stabilizing the soil, preventing erosion, increasing soil permeability and decreasing storm water runoff. Vegetation also buffers adjacent and/or incompatible land uses, lessens the impact of noise, wind and heat, improves air quality through photosynthesis, provides a visually attractive amenity and acts as a refuge for wildlife.

Mixed pine and ~~hardwoods~~ hardwood tree stands are located in the upland areas and are generally characterized by the following predominant species: American Beech, Loblolly Pine, Virginia Pine, Tulip Poplar, Oaks and Dogwood. Most of the land in the City has been cleared and reforested several times, so that most of the hardwoods and all of the pines are not in mature stands and, therefore, are of limited quality. The deforestation typically associated with residential and commercial development is a significant environmental and aesthetic concern and impacts the City's wooded character. The city also has several wooded ridgelines within the tidal marsh areas. These wooded areas, including Black Walnut Ridge, not only provide wildlife habitat but also can protect developed areas from tidal flooding caused by northeasters and hurricanes.

There are very few active farms remaining in Poquoson. ~~Much~~ Most of the existing "farms" are really large gardens that generate produce such as corn, tomatoes, pumpkins and berries that are sold at local produce stands. Almost all of Poquoson's significant cropland and livestock operations have been converted to subdivisions. Of the vacant land remaining in Poquoson, 21 percent of this land totaling roughly 2000 acres, is comprised of agricultural, woodland, or open areas. The conservation of these open spaces, particularly the garden farms and small pine forest groves, are critical to the preservation of Poquoson's small town atmosphere.

Topography

Poquoson's topography is very flat and low with the highest elevations reaching approximately 10 feet above sea level. The low elevations and flat topography make the land difficult to drain and susceptible to both tidal and stormwater flooding. Poorly drained soils interact with Poquoson's topography, which help to influence the development of wetlands and influence land use patterns. The presence of wetlands requires more restrictions for building and construction and, therefore, make development much more difficult.

Soils

Poquoson must consider the properties of its soil before it can begin any type of development. The City has to deal with hydric soils, a high water table, shrink/swell potential of the soil, poorly drained soils, improperly functioning septic systems, and Chesapeake Bay Preservation Area (CBPA) constraints.

The United States Department of Agriculture Soil Conservation Service defines a hydric soil as a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil. The United States Army Corps of Engineers requires the presence of a hydric soil before an area can be called a wetland. Hydric soils are widespread in the City of Poquoson. Not all areas of hydric soils contain wetlands; however, hydric soils are susceptible to poor drainage, a high water table, and temporarily to permanently saturated conditions.

Poquoson's soils consist predominantly of the Tomotley ~~Altavista-Dragston Association~~Udorthents Munden-Axis-Nimmo composition. They are deep, and poorly drained to moderately well drained soils. The soils have loamy subsoil and are nearly level. According to the Soil Conservation Service, Tomotley, ~~and Dragston~~ Tomotley and Nimmo soils have severe limitations for all kinds of residential and commercial buildings, roads and septic tanks due to high seasonal water tables and a slow percolation. ~~Altavisa~~ Tomotley and Nimmo soils have severe limitations for septic tanks and homes with basements, but only moderate limitations for homes without basements, commercial buildings and roads due to a lower seasonal water table. Axis is basically all marshland, and for the most part, cannot be built on.

Soil surveys and other inventories help to identify areas that are vulnerable to poor development and land use practices. Erosion and sedimentation regulations, floodplain ordinances, the environmental management area overlay district, and other regulations attempt to address development issues regarding soils by attempting to discourage incompatible land uses on environmentally sensitive soils. For any project located on potentially hydric soils, the City recommends a wetland delineation, as well as the confirmation of that delineation by the United States Army Corps of Engineers.

Water Table

A high or seasonally high water table may create significant limitations for building foundations, septic effluent disposal, road construction, parking lot construction, etc. ~~In almost every area of the city, the water table is less than 2 ½ feet below the ground surface. This coupled with the lack of topographical relief produces extremely wet conditions in many areas, which must be dealt with during the development process.~~ The water table in Poquoson typically lies between the surface and 2.5 feet (28 inches) beneath the surface year round. The high water table, coupled with the lack of topographical relief, causes saturated to nearly saturated conditions in many areas of the City (especially after storms) and may last for extended periods of time. This condition must be dealt with during the developmental process. The presence of a high water table can also cause structural problems in building foundations by slowly corroding concrete and/or steel footings for structures. In areas having soils with a high water table, precautions need to be taken to ensure that proper foundations are laid.

The suitability of soils for supporting a properly functioning septic system is dependent on such factors as slope, susceptibility to sever wetness, flooding potential, percolation rate, and filtering characteristics. Due to the poor soils and high water table, septic systems are not an appropriate form of sewage disposal in Poquoson and the expansion of public sewer is now necessary for all new development. There is no soil within the City of Poquoson that is described as suitable for septic systems. High ground water tables and "tight" non-percolating soils allow raw sewage to leach directly into the water table from drain fields without first being filtered by unsaturated soil. This untreated or poorly treated effluent ends up in tidal estuaries around the City, polluting those important bodies of water, and contributing to the closure of productive shellfish grounds. This is a citywide problem that was previously addressed through lot size requirements and the requirement for backup septic systems in areas without sewers. Recognizing ~~this~~, the

inappropriateness of septic systems, the City Council, ~~adopted~~ in 1991, adopted regulations, which effectively eliminate the installation of septic systems in Poquoson. The extension of the sanitary sewer system in Poquoson will alleviate many of the problems caused by septic systems over time as failing septic systems are filled and sewage is diverted to a central processing facility.

Shrink-Swell Potential

Several soils found in the City of Poquoson have a moderate to high shrink-swell potential. The shrink-swell potential is a measurement of the volume change in a soil based on the saturation and the drying of the soil. This volume change is due to the ability of certain clay minerals in the soil to trap and hold moisture. The amount of shrinking or swelling depends on the amount of clay in the soils, as well as the weight load on the soils. The shrinking and swelling of the soil may damage structures placed on soils with moderate to high shrink-swell potentials, and special design of these structures is often needed.

Poorly Drained Soils

Many soil areas within Poquoson are poorly drained. Rainwater of water from storm events will pond in depressions in this soil and could stand for several days to weeks. Extensive ditching within these areas is sometimes needed to ensure proper drainage of these areas. Care should be taken, however, if ditches are to be installed in an area with poor drainage. Areas that contain poorly drained soils commonly have wetlands in which certain construction activities are regulated by state and federal agencies. Consultation with a qualified professional as to the regulations and requirements, which may pertain to a specific project site with poor drainage, should be undertaken, as well as any necessary permits issued, before any land disturbance within an area with poor drainage occurs. A wetlands delineation is recommended as well as the confirmation of that delineation by the U. S. Army Corps of Engineers in the preliminary planning stage of any project located on poorly drained soils. Field verification of the soils for a given project should also be performed during the planning stage of any new structure.

The environmentally sensitive physical characteristics of Poquoson's soils must be dealt with carefully. Poquoson must insure that land use is compatible with the physical characteristics of the land. Table 1 provides a breakdown of the soils in Poquoson and their suitability for certain uses. This information does not apply in all cases to all soils. Site specific testing of the soils should be performed before any construction project begins to determine which, if any, of the conditions listed in Table 1 exist on the given project site.

Erosion and Sediment Control

Erosion and subsequent loss of soil often accompany development that has not been adequately designed for controlling sediment loss. As a form of non-point source pollution, sediment often binds with phosphorous and nitrogen in the soil and when erosion occurs, these pollutants end up

in the stream system. Uncontrolled runoff also has the potential to cause erosion and siltation problems for properties located down stream from the land disturbance.

State Erosion and Sedimentation Control regulations are administered locally through the City's Erosion and Sedimentation Control Ordinance. These regulations were developed to eliminate or reduce the amount of soil erosion occurring during development when land is cleared of vegetation. The ordinance was recently brought into compliance with the amended State Erosion and Sedimentation Regulations and the ~~Chesapeake Bay Preservation Ordinance~~Environmental Management Area Overlay District of the City Code, which requires that an erosion control plan be submitted to the City when land disturbance, including single family home construction, exceeds 2,500 square feet of land in a Chesapeake Bay Preservation Area (which includes the entire ~~city~~City of Poquoson). The erosion and sediment control plan is reviewed for consistency with City regulations and to ensure that properly sited erosion control devices (i.e. silt fences, straw bale, etc.) are installed on the site to capture soil loss. During land clearance and construction, staff from the Engineering Department inspect and enforce the approved erosion control plan.

Water Quality

Water quality is a critical issue to all communities, but it particularly so for Poquoson because of its location and topography. Not only is water an important resource in terms of providing drinking water, it also provides important recreational, aesthetic, and economic benefits to the City. As with the other resources considered in this element, regulation of water quality involves a significant number of programs and initiatives at the federal, state and local levels. These regulations and requirements are primarily directed at three targets:

- Point sources - i.e. "end-of-the-pipe" discharges- leaking underground storage tanks.
- Non-point sources - agriculture, stormwater runoff, and land development activities.
- Wetlands - which serve as natural filters and groundwater recharge areas.

All of these sources, together with the natural forces acting on the City's shoreline, contribute directly and indirectly to the level of water quality in the Chesapeake Bay, Poquoson River, Back River and all of their tributaries.

Point Sources

In adopting the Federal Water Pollution Control Act in 1972, Congress made it a federal government responsibility to establish and enforce water quality standards as a means of controlling pollution of the nation's waterways. The goal of this act, which later became the Clean Water Act, is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters". In order to achieve this goal, the Act originally only considered point source discharges. Specific standards are incorporated into the permits for these types of

discharges. Referred to as the National Pollutant Discharge Elimination System (NPDES) permits, the State has assumed responsibility for issuing these permits through the State Water Control Board. Permits are now referred to as Virginia Pollutant Discharge Elimination System (VPDES) permits.

The Clean Water Act prohibits the discharge of a pollutant into State waters without a VPDES permit. Such permits often limit the amount and manner in which the pollutant can be discharged. Industrial wastes and wastes from sewage treatment plants are uses that typically require a VPDES permit prior to any discharge.

The Water Quality Standards established by the State Water Control Board require maintaining the levels of dissolved oxygen and pH for waters in and around Poquoson. Other standards have been established for mercury, chlorine, and other substances. In areas where shellfish are present, fecal coliform levels are established. In meeting established standards, new industries or modifications to existing industries must use the "best available control technology" in order to comply with the water quality standards.

Non-Point Sources

In 1987, the Clean Water Act was amended to include "non-point" sources (i.e. pollution from an indirect source such as stormwater runoff). Non-point source pollution in waters surrounding Poquoson come from several sources - residential, urban, and/or agricultural runoff, failing/inadequate septic systems, natural conditions and drainage, and boat pollution from public and private boat slips. Loss of protective vegetation and the increase in impervious surfaces (buildings, roads, and parking lots) will increase the amount of stormwater runoff and also the runoff levels of pollution and nutrients. Besides sediment and nutrients, there are some toxins that are discharged adding to the overall stress on the finfish and shellfish population. Land use activities contribute directly to a decrease in water quality through the various activities shown in Table 1.

Estuary Condemnation

Failing and/or inadequate septic systems in Poquoson appear to be a critical environmental situation facing the City. Poquoson soils are known for their high water table and inability to percolate properly. The combination of these factors creates a situation where effluent is able to leach into the water table without being properly filtrated through the soil. It is theorized that some of the areas of Poquoson's waters, that are infected with fecal coliform bacteria, are infected for this reason. At the present time, parts of five (5) of the city's estuaries have been condemned by the State Health Department for the taking of commercial shellfish as a result of fecal coliform bacteria. As a result of this contamination, many questions have arisen as to the exact cause(s) and source(s) of this contaminant. In an effort to answer these questions, the city, utilizing funds and technical assistance from the Chesapeake Bay Local Assistance Department, (CBLAD) ~~will~~ attempted to identify the source and methods to eliminate such bacteria during fiscal year 1999.